

**CLAIMS**

1. At least one isolated pigmented anaerobic bacterium comprising a 16S rRNA  
5 DNA sequence at least 95% homologous to a sequence selected from the group consisting  
of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 wherein the bacterium causes, either directly or in  
combination with other pathogenic agents periodontal disease in companion animals,
2. The bacterium according to claim 1 comprising a 16S rRNA DNA sequence at  
10 least 99% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3,  
4, 5, 6, 9, 10 and 13.
3. The bacterium according to claim 1 comprising a 16S rRNA DNA sequence at  
least 99.5% homologous to a sequence selected from the group consisting of SEQ ID NOS:  
15 3, 4, 5, 6, 9, 10 and 13.
4. The bacterium according to claim 1 comprising a 16S rRNA DNA sequence  
selected from the group consisting of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13.
- 20 5. The bacterium according to claim 1 which is *Bacteroides denticanoris*.
6. The bacterium according to claim 5 which is ATCC PTA-5881 or a bacterium  
having all of the identifying characteristics of ATCC PTA-5881.
- 25 7. The bacterium according to claim 1 which is *Porphyromonas levii*.
8. The bacterium according to claim 7 which is ATCC PTA-5882 or a bacterium  
having all of the identifying characteristics of ATCC PTA-5882
- 30 9. The bacterium according to claim 1 which is *Tannerella forsythensis*.
10. The bacterium according to claim 9 which is ATCC PTA-6063 or a bacterium  
having all of the identifying characteristics of ATCC PTA-6063
- 35 11. The bacterium according to claim 1 wherein the companion animal is a cat or a  
dog.
12. An immunogenic composition comprising the pigmented anaerobic bacterium  
according to any of claims 1 through 11.

13. The immunogenic composition of claim 12 wherein the pigmented anaerobic bacterium is inactivated.
- 5           14. The immunogenic composition of claim 12 further comprising a pharmaceutically acceptable carrier.
- 10           15. A vaccine for treating or preventing periodontal disease in companion animals comprising an immunologically effective amount of the bacterium according to any of claims 1 through 11 and a pharmaceutically acceptable carrier.
16. The vaccine of claim 15 wherein the bacterium is inactivated.
17. A vaccine composition as in claim 15, further comprising an adjuvant.
- 15           18. A method for treating or preventing periodontal disease in companion animals comprising administering to a companion animal in need thereof, a vaccine composition according to any of claims 15, 16 or 17.
- 20           19. A method for diagnosing periodontal disease in companion animals by analyzing a sample from the oral cavity of the companion animal wherein the presence of one or more pigmented anaerobic bacteria according to any of claims 1 through 11 in the sample is indicative of disease.
- 25           20. A according to claim 19 wherein the presence of a polynucleotide comprising a 16S rRNA DNA sequence at least about 95% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 in the sample is indicative of disease.
- 30           21. A method according to claim 20 wherein the presence of a polynucleotide comprising a 16S rRNA DNA sequence at least about 99% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 in the sample is indicative of disease.
- 35           22. A method according to claim 20 wherein the presence of a polynucleotide comprising a 16S rRNA DNA sequence at least about 99.5% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 in the sample is indicative of disease.

23. A method according to claim 20 wherein the presence of a polynucleotide comprising a 16S rRNA DNA sequence selected from the group consisting of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 in the sample is indicative of disease.

5           24. The method according to claim 19, wherein said analyzing step includes analyzing the sample using a method selected from the group consisting of PCR, hybridization, and antibody detection.

10           25. A kit comprising, in at least one container, a composition for treating and preventing periodontal disease in companion animals comprising an effective amount of at least one live or inactivated isolated pigmented anaerobic bacteria, of any of claims 1 through 11 and a pharmaceutically acceptable carrier; wherein the kit further comprises a set of printed instructions indicating that the kit is useful for treating or preventing periodontal disease in companion animals.

15           26. A kit according to claim 25, wherein said kit further comprises a means for dispensing said composition.

20           27. A kit comprising in at least one container an isolated DNA molecule comprising a nucleotide sequence of at least about 15 contiguous nucleotides selected from any of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13, which hybridizes under highly stringent conditions to the complement of any of the nucleotide sequences depicted in SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13, and a second isolated DNA molecule comprising in a second container an isolated DNA molecule comprising a nucleotide sequence of at least about 15 contiguous  
25           nucleotides selected from the complement of any of the nucleotide sequences depicted in SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13 which hybridizes under highly stringent conditions to any of the nucleotide sequences depicted in SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13, wherein the kit further comprises a set of instructions indicating that the kit is useful for the detection of *Bacteroides*, *Porphyromonas*, or *Tannerella* spp.

30           28. A hybridization kit comprising in at least one container an isolated DNA molecule comprising a nucleotide sequence of at least about 15 contiguous nucleotides selected from any of SEQ ID NOS: 3, 4, 5, 6, 9, 10 and 13, or its complement, wherein the hybridization is specific to *Bacteroides*, *Porphyromonas*, or *Tannerella* spp. and wherein the  
35           kit further comprises a set of instructions indicating that the kit is useful for the detection of *Bacteroides*, *Porphyromonas*, or *Tannerella* spp.

          29. The kit according to claim 28 wherein the hybridization is performed under highly stringent conditions.

30. A biologically pure culture of bacteria wherein the bacteria comprise a 16S rRNA DNA sequence at least about 99% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3, 6, 9, 10 and 13.

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31. A biologically pure culture of bacteria according to claim 30 wherein the 16S rRNA DNA sequence is at least about 99.5% homologous to a sequence selected from the group consisting of SEQ ID NOS: 3, 6, 9, 10 and 13.

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32. A biologically pure culture of bacteria according to claim 30 wherein the 16S rRNA DNA sequence is selected from the group consisting of SEQ ID NOS: 3, 6, 9, 10 and 13.

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33. A biologically pure culture of bacteria which is ATCC PTA-5881 or a culture having all of the identifying characteristics of ATCC PTA-5881.

34. A biologically pure culture of bacteria which is ATCC PTA-5882 or a culture having all of the identifying characteristics of ATCC PTA-5882.

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35. A biologically pure culture of bacteria which is ATCC PTA-6063 or a culture having all of the identifying characteristics of ATCC PTA-6063